COVID-19's Impact on the Denver Nuggets Revenue

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Introduction

The comradery that is engrained in sports intertwines communities across the world, providing the ability to socialize, gather and rally behind a common force. The COVID-19 pandemic put a stop to all sporting events in mid-2020, causing massive ripple effects throughout the world. For the first time in history the Olympic Games were postponed along with other major sporting events such as FIFA, the NBA season, and the Boston Marathon. In addition to the March cancellation, fans have been prohibited throughout the 2021 season until very recently. The lack of fan attendance over the past year has severely damaged the revenue earned by many sports organizations around the world.

A common misunderstanding surrounding sports economics is that sports organizations are monetarily beneficial to the surrounding areas (Siegfried, J. 2002). The benefits from having a sports team are that it provides entertainment and a sense of community that surrounds the sports team. The most important aspect is that the players, whose salary often exceeds millions of dollars, do not prioritize the local economy when choosing where to consume goods. During the 1999-2000 season, only 29% of NBA players resided in the surrounding area of their team during the offseason (Siegfried, J. 2002). In comparison, during the same season, 93% of employees who worked at the organizations lived within the surrounding area of their team (Siegfried, J. 2002). In addition to athlete spending, out of state tourist spending is significantly lower than what most people believe. At a typical NBA game approximately 5-20% of the attendance is from out of state (Siegfried, J. 2002). While a tourist may spend a modest amount of money at a basketball game, the opportunity cost of spending money elsewhere in the city shows that going to a basketball game is a low-income source from out of state tourists. A tourist

may easily spend more money in Denver in the two and a half hours a basketball game takes than in the stadium itself.

For example, With the recent departure of the Oakland Raiders from their hometown of Oakland, mixed opinions arose surrounding the monetary value the city receives from the original induction of the sports team. According to the Wall Street Journal, taxpayers have been losing around $1,000,000 a year from hosting sporting events in the stadium (Elinson, Z. 2017). Despite taxpayers rejoicing over the departure of the Oakland Raiders, the team was seen as an employer that was entry-level friendly and community driven. The stadium was home to more than 3,000 employees who relied on the organization for easy access to jobs (Elinson, Z. 2017). Overall, the importance of a sports franchise may not lie in its monetary value but, the employees and the community that surrounds the team brings a view that needs to be considered.

How does all this play into the COVID-19 pandemic in Colorado? The postponement of the 2019-2020 season, in addition to the absence of fans, has created a financial and social rift during one the of the Nuggets best seasons in the last 10 years. The arena was consistently getting more attendees every year and employees enjoyed a native Colorado employer who supplied them with benefits. Revenue was at an all-time high in the 2019-2020 season, totaling 252 million dollars. Using data from previous seasons I aim to estimate the total revenue lost from having no fans over the course of the pandemic. To calculate my estimation I will use the average and total attendance in tandem with average ticket price. In addition to revenue loss, I will also explore how social media followers can be used a measure of intensity of preference for the Denver Nuggets to help make future estimates more realistic. To what magnitude has the COVID-19 pandemic effected the potential revenue of the Denver Nuggets? How has the cancellation of the major sports leagues trickled down into the local Colorado communities? This paper aims to

estimate the potential revenue for the Denver Nuggets alongside analyzing the potential policy effects of local economies within Colorado.

Review of Literature

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Data Set

Full Data Set

Average NBA ticket and concession price by team – Nuggets:

2017-18: $54.16

2018-19: $54.63

Beer: $10
Nachos: $8
Parking: $8.50 -$27

Gate Revenue – Nuggets

2018-19: $47 million

2019-20: $37 million

Home Games Played

2018-19: 41

2019-20: 37

2020-21 (not complete): 25

Total Home Attendance:

2018-19: 756,457

2019-20: 633,153

2020-21 (not complete): 11,057

Attendance per Home Game (% of capacity):

2018-19: 18,450 (94.5%)

2019-20: 19,186 (98.3%)

2020-21 (not complete): 2,764 (15.1%)

Source: Rodney Fort's sports business data

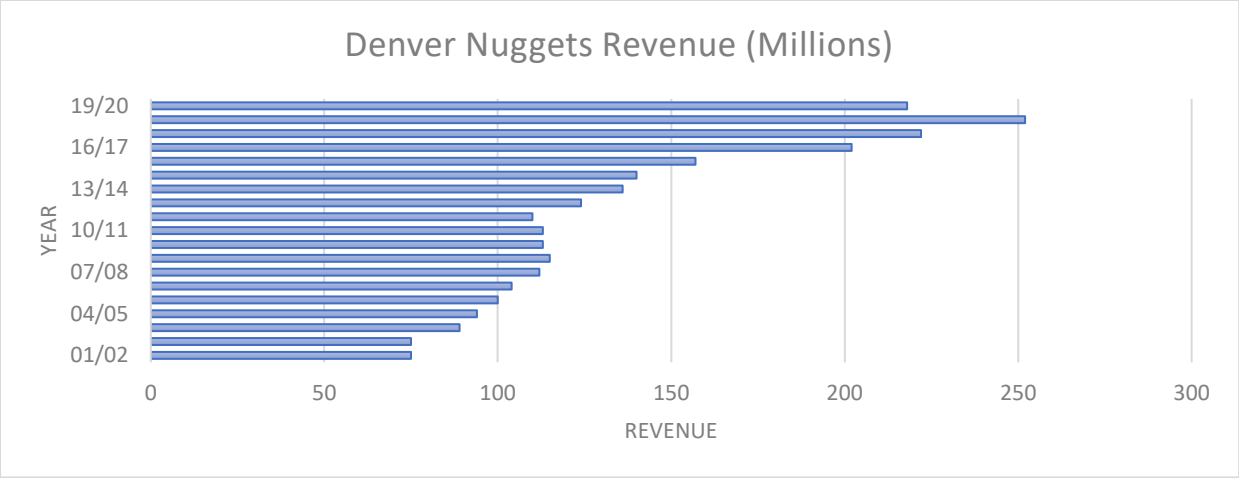
Year	AVG Ticket Price	Revenue (Millions)	Average Attendance	Total Attendance	Twitter Followers	Facebook Followers
01/02	$38.11	$75	NA	NA	NA	NA
02/03	$32.77	$75	NA	NA	NA	NA
03/04	$32.77	$89	NA	NA	NA	NA
04/05	$35.50	$94	NA	NA	NA	NA
05/06	$36.98	$100	NA	NA	NA	NA
06/07	$42.72	$104	17230	706437	NA	NA
07/08	$44.29	$112	17364	711962	NA	NA
08/09	$47.3	$115	17223	706165	NA	NA
09/10	$47.3	$113	17995	737812	NA	NA
10/11	$47.3	$113	16901	692968	NA	NA
11/12	$47.3	$110	16930	561966	150000	930000
12/13	$47.3	$124	17819	730616	270000	1480000
13/14	$54.23	$136	16899	692898	370000	1830000
14/15	$53.15	$140	14700	602707	460000	1900000
15/16	$54.00	$157	14095	577898	600000	1960000
16/17	$52.38	$202	14770	695585	780000	1960000
17/18	$54.14	$222	17141	702796	790000	1960000
18/19	$54.63	$252	18450	756457	960000	2000000
19/20	$54.63	$218				

Sources: All data used for graphs and models is from https://www.statista.com/

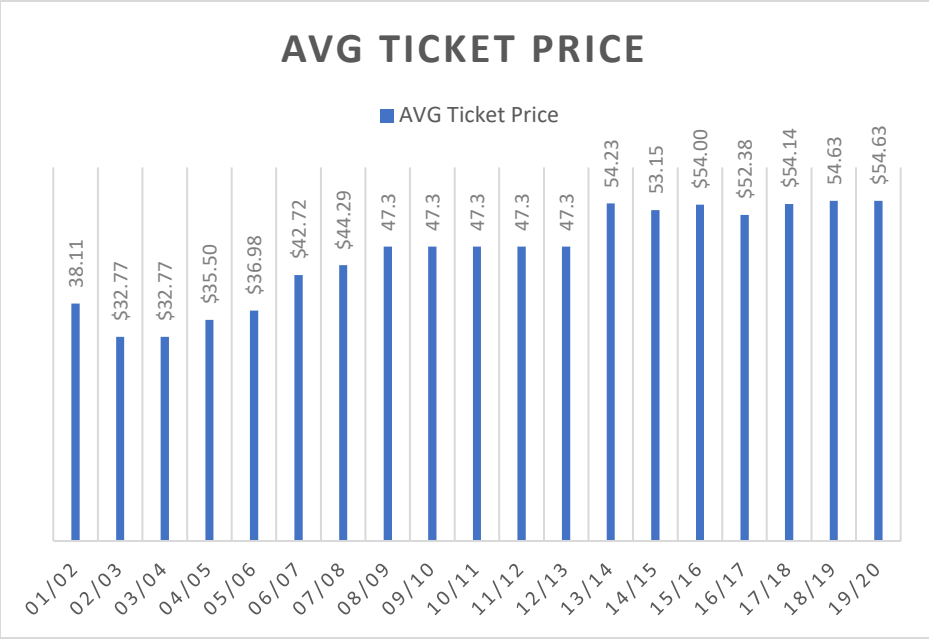
Data Points

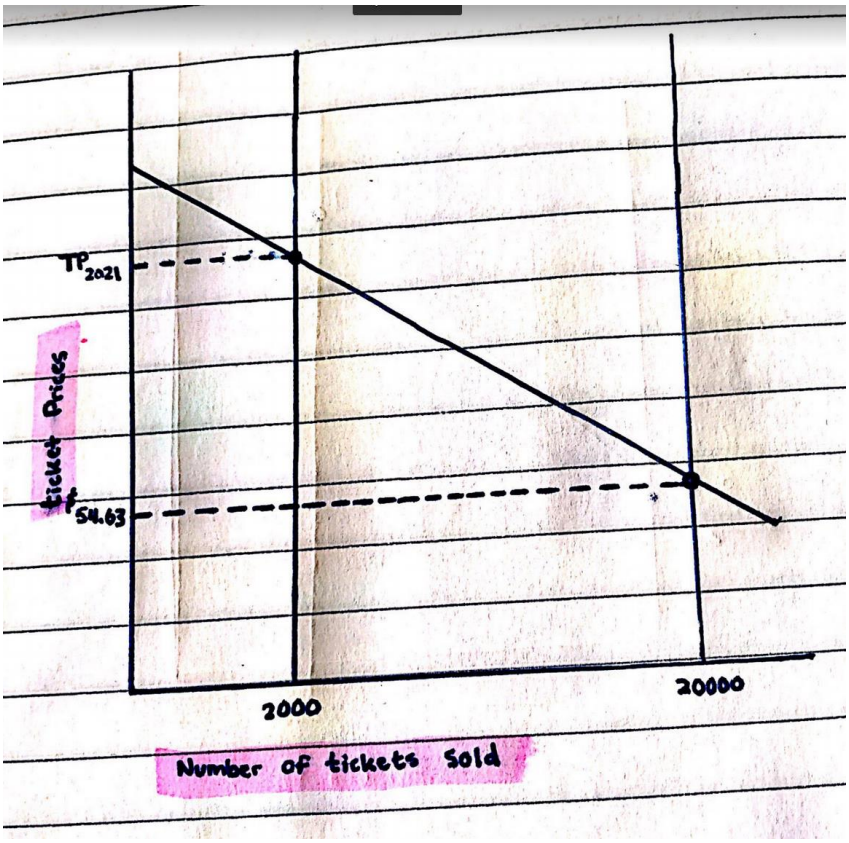
Revenue

Since 2001, there has been an overall increase in the **average revenue** if the Denver Nuggets of 6%. Determining the potential revenue losses for 2020/2021 season and the surrounding areas starts with this number. In those years, the total revenue has gone from 75 million in 2001 to 218 million in 2020.



Ticket Price





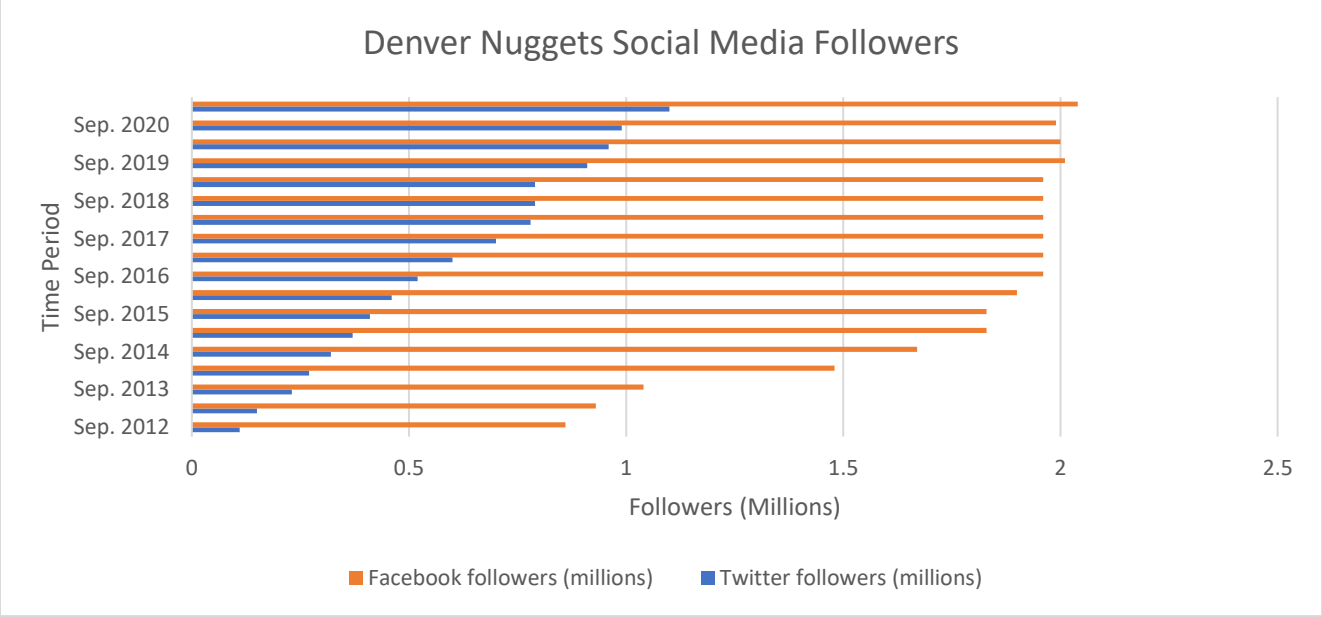
The average ticket price is imperative to calculating revenue lost over the course of the COVID-19 pandemic because of how prices change when supply and demand are altered. When 20,000 seats are available, the total amount earned from tickets can be determined by the average ticket price. Ticket price increases also correspond to an increase in demand for tickets. With the 2020-2021 season just now allowing 2,000 fans to attend, there may be supply and demand shifts in terms of ticket pricing.

Social Media Followers

Social media has become the main way for fans to interact with their favorite sports teams. The number of followers can indicate the popularity and attention be given to an organization. Oftentimes, big shifts in followers come from performances that entice people to follow the teams more. My goal is to estimate the impact of social media followers on revenue. In addition to this, social media followers may be the best way of determining the intensity of

preference for the Nuggets. This is because while there may not be fans allowed in the stadium, fans still can interact and show their loyalty through social media.

Time Period	Twitter followers (millions)	Facebook followers (millions)	% change Twitter	% change FB	
Sep. 2012	0.11	0.86			
Feb. 2013	0.15	0.93	4%	7%	
Sep. 2013	0.23	1.04	8%	11%	Playoff Appearance
Mar. 2014	0.27	1.48	4%	44%	
Sep. 2014	0.32	1.67	5%	19%	
Mar. 2015	0.37	1.83	5%	16%	
Sep. 2015	0.41	1.83	4%	0%	
Mar. 2016	0.46	1.9	5%	7%	
Sep. 2016	0.52	1.96	6%	6%	Hiring of Coach Mike Malone
Mar. 2017	0.6	1.96	8%	0%	Above .500 Win Rate for the
Sep. 2017	0.7	1.96	10%	0%	first time in 5 years
Mar. 2018	0.78	1.96	8%	0%	
Sep. 2018	0.79	1.96	1%	0%	
Mar. 2019	0.79	1.96	0%	0%	
Sep. 2019	0.91	2.01	12%	5%	Made it to W. Conference Semis
Mar. 2020	0.96	2	5%	-1%	Made it to W. Conference Finals
Sep. 2020	0.99	1.99	3%	-1%	
Mar. 2021	1.1	2.04	11%	5%	Jokic Frontrunner for MVP

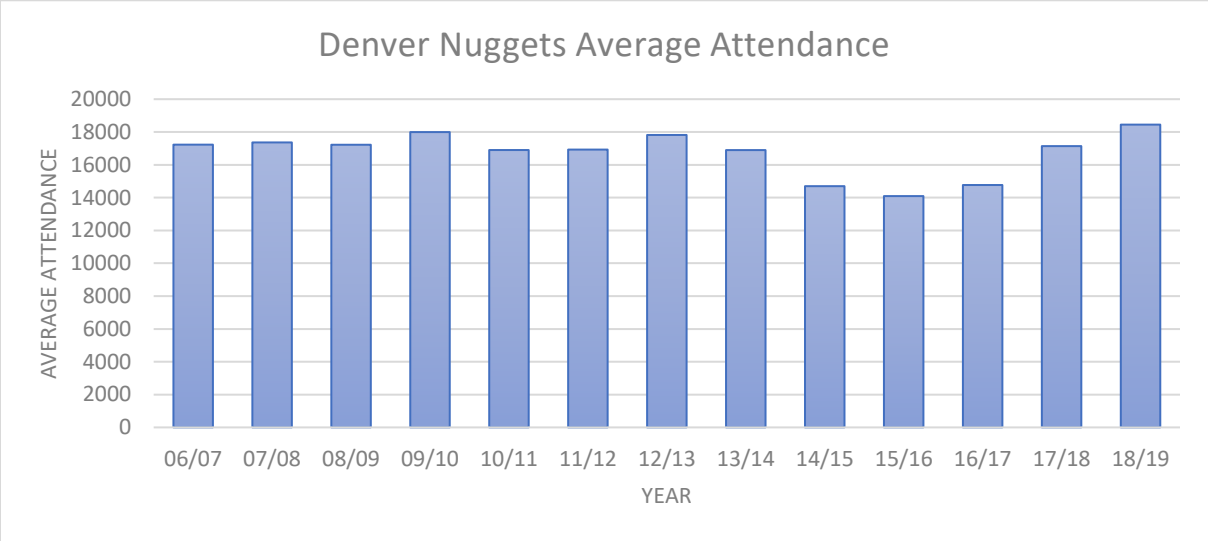


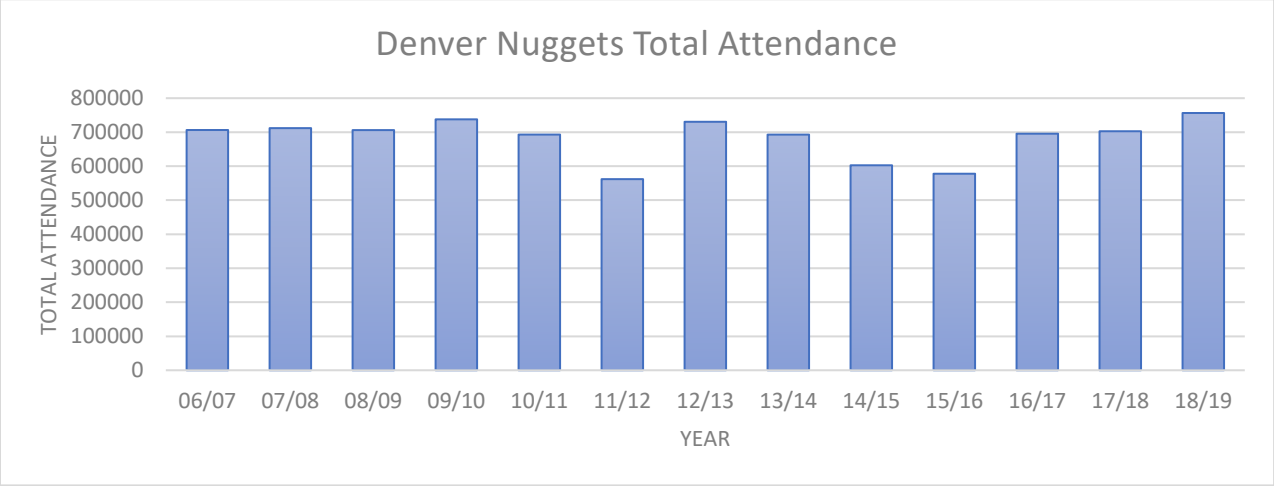
Average & Total Home Attendance

As the Nuggets eclipse the .500 mark during the 2018/2019 season, fans begin to get more excited. Traditionally, teams without huge markets suffer immensely, in terms of fan attendance, when their team is preforming below average. As the Nuggets hit what seems to be the start of something great, fans scurry to go see their local team in numbers that were unlikely to be seen in the prior 5 years. The maximum capacity at Ball Arena in Denver is 20,000 fans in total. In the 2018/2019 season there was an average of 18,450 fans at each game, blowing away the previous year's average by 1,309 fans. The trend of increased fan attendance in each of the previous seasons, I will assume there would be maximum capacity for this season. To determine this, I have collected data from another team who's discouraged fans got to experience the turnaround of a team due to a budding MVP player and a playoff bound season. The team I am comparing the Nuggets to is the Oklahoma City Thunder. During the 2013/2014 season Oklahoma City got an MVP bid with Kevin Durant along with making an impressive run through the Western Conference playoffs. During this time, the Thunder sold out their stadium for 8 consecutive years, filling all 18,203 seats every game. The reason I am comparing the Nuggets to the Thunder is because of the nature of a small market team turning around their franchise with one single player. This can have massive effects on fan's willingness to go to games. This also allows for ticket prices to be higher and for stadiums to make more money off concessions.

Oklahoma City Thunder Attendance				Denver Nuggets Attendance		
Year	Total Attendance	Average Attendance	Notes	Year2	Average Attendance	Total Attendance
06/07	654,163	15,955		06/07	17230	706437
07/08	547,556	13,355	KD Drafted	07/08	17364	711962
08/09	747,732	18,693		08/09	17223	706165

09/10	738,149	18,003		09/10	17995	737812
10/11	744,068	18,148		10/11	16901	692968
11/12	600,699	18,203		11/12	16930	561966
12/13	746,323	18,203		12/13	17819	730616
13/14	746,323	18,203	KD MVP	13/14	16899	692898
14/15	746,323	18,203		14/15	14700	602707
15/16	746,323	18,203		15/16	14095	577898
16/17	746,323	18,203		16/17	14770	695585
17/18	746,323	18,203		17/18	17141	702796
18/19	746,323	18,203		18/19	18450	756457





Correlation Matrix

	AVG Ticket Price	*Revenue (Millions)*	*Average Attendance*	*Total Attendance*	*Twitter Followers*	*Facebook Followers*
AVG Ticket Price	1					
Revenue (Millions)	0.774934417	1				
Average Attendance	-0.402353362	-0.065089704	1			
Total Attendance	-0.180215308	0.215047821	0.694388087	1		
Twitter Followers	0.736065904	0.971222896	-0.005943499	0.498912541	1	
Facebook Followers	0.885353382	0.673721034	-0.283893214	0.410132734	0.797527377	1

Research and Results Discussion

Research Question

As a result of the COVID-19 outbreak, what are the revenue losses for the Denver Nuggets organization?

Hypothesis

Despite sporting events being a low-income source for their respective cities, I hypothesize that the Denver Nuggets organization would have had a record year in terms of revenue. This hypothesis also trickles down into the surrounding businesses. With the increased attention of new fans watching basketball, the surrounding economies would not see much of a difference in terms of revenue gained.

Analysis of Data

During the 2019-2020 season, on average 19,186 fans attended a home Nuggets game. To calculate the average revenue earned per game, the following equation is used:

$$Revenue\ Lost\ Per\ Game = Average\ Attendance\ \times (Average\ Ticket\ Price + Average\ Concession\ Spending + Average\ Parking\ Spending)$$

$$Revenue\ Lost\ Per\ Game\ in\ 2019 - 2020 = 19186\ \times (\$54.63 + \$9 + \$18)$$

$$= \$1{,}566{,}153\ per\ game$$

To calculate the expected revenue in the event of no pandemic this season I will assume that capacity is met within the stadium. This is derived from the comparison between the Oklahoma City Thunder and the Denver Nuggets. As a result of Kevin Durant's Most Valuable Player (MVP) season, the Thunder we able to sell out their stadium for the following 6 years. The most important aspect to attendance for teams is winning. During both these teams' peaks, they boasted incredible win rates along with having an MVP candidate on their team. With Nikola Jokic being the frontrunner for MVP this season, we can assume that the Nuggets would have had max capacity or close to it, every game this season. To calculate this, I modified the equation above to reflect a situation where the Nuggets reach full capacity every game for all 41 home games during a regular season.

$$Revenue\ for\ Whole\ Season\ (Full\ Capacity) =$$

$$Maxiumum\ Attendance\ \times (Average\ Ticket\ Price + Average\ Concession\ Spending + Average\ Parking\ Spending) \times Number\ of\ Home\ Games$$

$$20000\ \times (\$54.63 + \$9 + \$18) \times 41 = \$66{,}936{,}600$$

To calculate the per game revenue for the simulated season, I simply divided the revenue for all the home games by 41.

$$\$66{,}936{,}600 \div 41 = \$1{,}632{,}600\ per\ game$$

In addition to this equation, the graph above illustrates how demand changes as the number of tickets supplied becomes a fraction of what was offered before. The vertical supply curve represents the number of tickets the stadium is supplying at the current time. As seen with less tickets available, demand increases, allowing for the average ticket price to be increased.

This could cause the total earnings from fans to increase as the team does better. Since I could not obtain average ticket prices for the 2020-2021 season, I will be using the previous years' numbers instead.

Another exigent data point is the revenue lost during the shutdown of the league in March 2020. Approximately 695 million dollars were lost during the shutdown of 258 games. To calculate the Nuggets losses, I created a simple equation that takes the revenue lost and divides it by 30 teams. This shows about how much revenue was lost for the Denver Nuggets during the shutdown of the season.

$$695\ million\ (Total\ Revenue\ Lost) \div 30\ (Number\ of\ teams\ in\ NBA)$$

$$= 23.17\ million\ dollars$$

To compare, I calculated the average games cancelled per team during the break:

$$258\ (Games\ cancelled)\ \div 30\ (Number\ of\ Teams\ in\ NBA) = 8.6\ games\ per\ team$$

With this number, I can confirm revenue lost from unsold tickets by using the revenue lost per game, calculated above in equation 1.

$$8.6\ \times\ \$1{,}566{,}153\ per\ game = \$13{,}468{,}917$$

This shows that $13,468,917 of the $23,170,00 lost during the time of the shutdown was due to the lack of fan attendance. This aligns with ESPN's Adrian Wojnarowski analysis of ticket revenue in the NBA where he claims 40% of the NBA's annual revenue comes from ticket sales (Wojnarowski, A. 2020).

The correlation matrix provides evidence that as Twitter and Facebook Followers rise, both revenue and total attendance rise as well. While this does not provide a direct correlation, I will assume that rises in social media followers show an increase in the intensity of preference for the Nuggets. In the 2021 season, the Denver Nuggets signed Facundo Campazzo, an

Argentinian born player whose popularity is massive in his home country. The rise in Twitter followers could directly be a result of Argentinians becoming active fans of the Denver Nuggets. This is one of many reasons the Nuggets revenue could have been at an all-time high this season. In March 2021, Twitter followers rose 11% and Facebook followers rose 5% from Fall 2020. During this time, Nikola Jokic rose to the leader in the MVP race, new audience was gained from Argentina, and the Nuggets began another 60+% win rate season. With the intensity of preference for the Nuggets at an all-time high, viewership, total attendance, and in part, revenue was all set to have a massive rise in 2021.

Discussion of Results

The assumption that the Denver Nuggets would reach full stadium capacity each game is derived from the data points collected in this analysis. Over the course of the 2020/2021 NBA season the Denver Nuggets Twitter accumulated an 11% increase in followers, while Facebook followers rose 5% as well. In the recent years, a surge in both total attendance and twitter followers has resulted from the Denver Nuggets run in the playoffs in both the 2018 and 2019 season. Using social media followers as a measure of the intensity of fan preference towards the Denver Nuggets show that as the team begins to move into being a championship contender, more social media users pay attention the team. Using the social media data, I will assume that the 2020/2021 season would have attracted fans to fill up Ball Arena to the max capacity of 20,000 fans.

The overall revenue lost from both the 2020/2021 season and the NBA shutdown that occurred in March 2020 was calculated using the average ticket price in addition to average concession spending, and average parking price. With an average attendance of 20,000 fans the Denver Nuggets would make $1,632,600 per game. When measured over the whole season, the total losses in ticket revenue for the Denver Nuggets would equal $66,936,600. In a vacuum, if

the Denver Nuggets made the same $252,000,000 over the course of the season this would come to 27% of their total revenue for the season.

Establishing $66,936,600 in lost revenue is only the beginning step to total revenue lost. In addition, the 2020-2021 season having no fans, the NBA was also shutdown in March 2020. The cancellation of 258 games caused a total loss of $695,000,000 to the teams in the NBA (Beer, T 2020). To calculate the Denver Nuggets Revenue losses, I divided this by 30 to get $23,170,000 of lost revenue per team. An important note here is that this calculation does not consider the size of a market for a team. A team such as the Golden State Warriors may take a greater loss than 1/30th of the total because of its massively large market. Due to Denver being a small market team, a more accurate number may be lower than the estimated $23,170,000. Despite this limitation in calculating the revenue lost per team, if added to the losses for the 2020-2021 season, the overall revenue lost is $90,106,600.

Lastly, according to Bradberry, an average of $7,000,000 is added to revenue whenever a team makes it to the post-season. Currently, the Denver Nuggets are the fourth seed in the western conference in-line to get a top seed for the 2021 playoffs. Assuming the Denver Nuggets make the playoffs this season $7,000,000 would be added to potentially lost revenue. This would bring the total to $97,106,600.

Conclusion

Economics of COVID-19 in Colorado

The lack of sports throughout the pandemic has unproportionally affected small sports bars within the Colorado area. According to certain local governments throughout the state, to be eligible for monetary relief there must have been a 20% loss in revenue between March 26th, 2020 and the present (windsorgov.com 2020). According to Justin Anthony, a local sports bar owner in Colfax, revenue has gone down over 60% since the pandemic began. This reflects on

the nature of sports bars compared to other dining establishments during a pandemic. While sports bars can conduct takeout-style business, the charm and appeal of sports bars are the community that surrounds the local sports teams. Justin Anthony, Denver bar owners Chris Fuselier and Angela Neri have experienced upwards of 50% revenue decline over the course of the pandemic (Sexton, J. 2020). In addition to revenue losses, curfews that have been established for bars strangle what little business they can cumulate (Boetsch, L. 2020). Small business relief has been prevalent in Colorado but, with the disproportional losses within the sports bar sector, policymakers and citizens should pay more attention to these small businesses.

Limitations

Due to confidentiality and limited data this research project faced many restrictions that created the need for estimated results. The entire data set contains twelve years of observations on annual timeframe. The everchanging nature of the NBA landscape and its viewership poses challenges when trying to compare financial numbers of previous years. If I had the ability to culminate more data, the most important numbers would be monthly twitter follower changes, the average ticket prices for the current season, total revenue earned from concessions, and average ticket price per game in 2021.

With the addition of data that tracks the monthly increase or decrease in twitter followers the estimations would have more statistical significance. Adding more data points allows for a stronger understanding of whether twitter followers could help predict revenue. In addition to revenue, twitter followers monthly allow for the examination of how specific events within the franchise effect twitter followers monthly. The correlation between total attendance and twitter followers would also be easier to measure due to the shorter bursts of data.

Another useful piece of data missing is average ticket price for the 2020-2021 season. The lag of this data is due to the recent availability of tickets in the market. The Nuggets decided

recently to begin to let fans enter the arena to spectate games. Data showing average ticket price for this season so far would allow for an analysis of the elasticity of demand of tickets. If there is a massive spike in ticket pricing due to lowering the supply to 2,000 ticket, I would be able to construct a better supply and demand model of ticket pricing.

The ability to access financial data regarding concessions would allow for an analysis on how Ball Arena is handling employment. In addition to this, the variable could be added to the estimates to determine the impact on the overall revenue. The concession data would allow for this project to have a human element that I believe is lacking for the time being. Without this data, it is tough to estimate how the organization is handling employment and how these employees are handling the pandemic.

Policy Implications

Since sporting events are a low source of income within the host community, policies aimed towards maximizing the amount of money earned from having an NBA team should be put in place. Cooperation between government and the Nuggets organization to produce a plan to encourage tourists to spend more money within the community while going to a Nuggets game would be the first step. For example, the city of Denver could utilize the space surrounding Denver to implement local businesses and hotels so that fans may be encouraged to spend more within the community. In addition to this, more local products could be mandated to be sold at arenas to increase profits going back into the local community. Lastly, vouchers or guides should be handed out at home games that encourage tourists to visit places outside of Denver. This could be a pamphlet that is distributed with coupons to attractions in other areas, such as Fort Collins, Colorado Springs and Aurora.

In addition to small business assistance, new laws should be put in place that require NBA players to allocate a certain percent of their spending towards the communities that foster

their team. Currently, many NBA players reside in another area during their offseason. For small organizations this is a slap in the face to the fans and viewers who help make it possible for these players to earn as much money as they do. I would suggest starting with requiring a proportion of players' salaries in relation to the proportion of ticket revenue earnings to be put back into local goods. This will help sports become monetarily viable for cities.

New policies that directly target benefits towards local businesses that rely on sporting events should be considered in the state of Colorado. Incentivizing out of state fans and players to consume local Colorado products would be invaluable to the local economy. Policymakers should consider implementing this because as of now, having a sports franchise is not beneficial to the local economy. Implementing ways to encourage people to spend more money within the state would allow for the Nuggets to have a huge impact on the local Colorado economies.